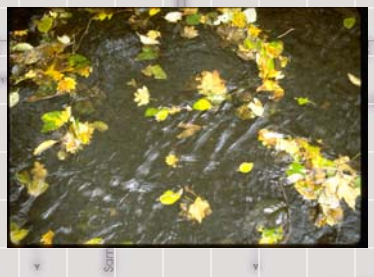
King County Groundwater Protection Program

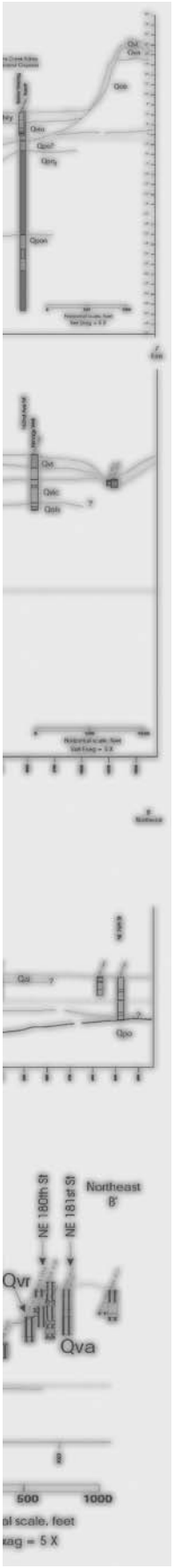
2002 Annual Report



King County
Department of Natural Resources and Parks
Water and Land Resources Division
Groundwater Protection Program

KING COUNTY GROUNDWATER PROTECTION PROGRAM
2002 ANNUAL REPORT

April 1, 2003



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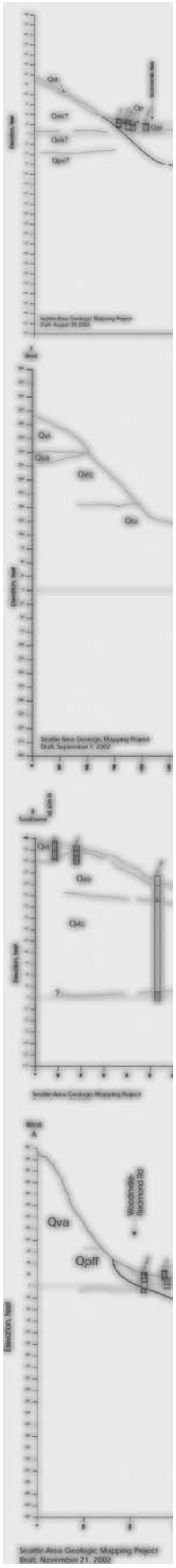
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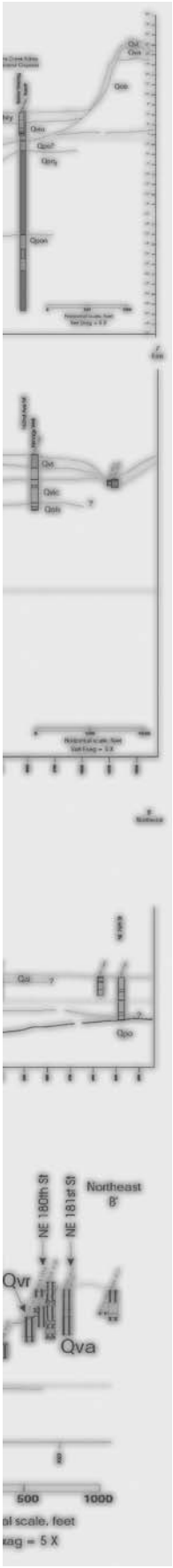
EXECUTIVE SUMMARY

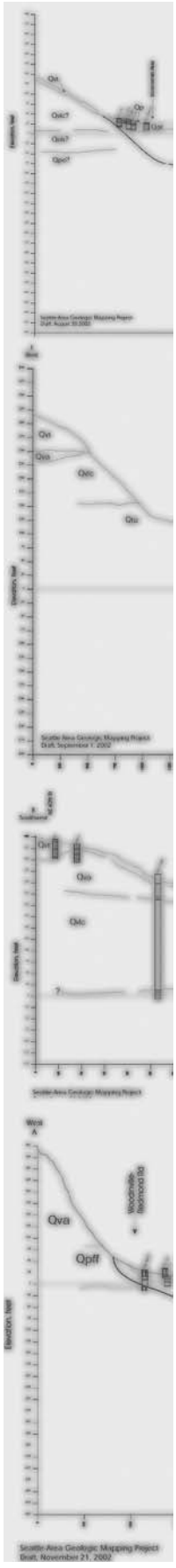
Assuring safe and reliable water supplies for King County citizens requires the protection of groundwater against threats to its quality and quantity. Groundwater is equally vital to fish, wildlife and our ecosystems and protecting it is also part of King County's commitment to meeting environmental stewardship obligations to its citizens.

In 2001, the King County Council approved an ordinance establishing the Groundwater Program and named the Department of Natural Resources and Parks as the lead agency, with implementation beginning the following year. A major part of that ordinance was the establishment of locally based Groundwater Protection Committees to oversee implementation of four certified Groundwater Management Plans for Vashon-Maury Island, East King County, Issaquah Creek Valley, and Redmond-Bear Creek Valley. By fall 2002, the members of all four Committees were appointed by Executive Ron Sims and confirmed by the King County Council. That year Program staff also began working with each Committee to prioritize each area's groundwater issues and activities.

In addition to the work with the Groundwater Protection Committees, the Groundwater Protection Program was successful in a number of activities in 2002:

- Developed a Program mission statement and Program goals and service area responsibilities.
- Completed a second series of ambient groundwater sampling and analysis, that show a continued high level of groundwater quality in the County.
- Continued focused groundwater sampling and analysis on Vashon-Maury Island and along the Sammamish River to address specific issues related to groundwater quality or fish habitat and water temperature.
- Presented groundwater protection information to over 4,000 students in 51 schools, and at a variety of festivals, fairs and other events throughout King County.
- Responded to inquiries from the public on groundwater or resource issues.
- Developed Web-based information resources on a variety of groundwater topics of interest to multiple audiences and users.
- Coordinated with the Department of Public Health on groundwater related topics, such as on-site septic systems and small drinking water systems and with the Department of Development and Environmental Services on the County Critical Areas policy and regulations.
- Developed a long-term vision for the program and initial evaluation of funding mechanisms.





In 2003, King County will face even greater challenges as it:

- Pursues implementation of the groundwater management plans.
- Works to refine the vision for the Program with stakeholders.
- Assists South King County in completing a Groundwater Management Plan.
- Further investigates funding options.
- Initiates focused monitoring efforts.
- Enhances its database function to include the development of an interactive groundwater model.
- Considers revisions to existing King County groundwater regulations.
- Expands education initiatives directed towards home owners.

All of this will be pursued in 2003 while recognizing the likely reductions in program funding in 2004. It will be a critical year for building a future for groundwater protection in King County.

Therefore, developing partnerships will be essential to maintaining and protecting King County's important groundwater resources. During this time of multiple environmental stresses and difficult economic times for local governments, the Groundwater Protection Program is committed to its part in providing value to King County residents through groundwater services.

CHAPTER 1

INTRODUCTION & PROGRAM HISTORY

Introduction

The purpose of this report is to provide a summary on groundwater protection activities performed in 2002 by the King County Groundwater Protection Program. King County Code 9.14.050 requires that the King County Department of Natural Resources and Parks (DNRP), as lead agency for the program, annually report program activities.

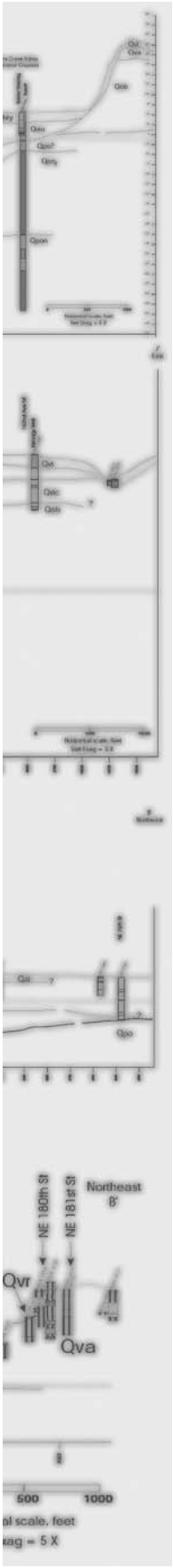
History

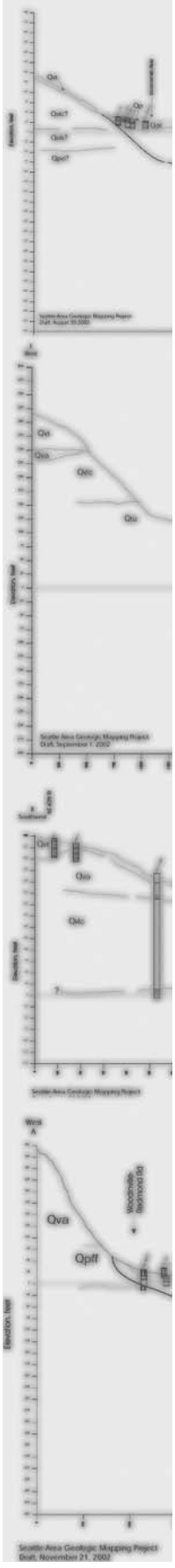
For many years, groundwater protection and related groundwater management activities have been an important part of King County's public health and environmental stewardship responsibilities. Public Health – Seattle & King County (Public Health) administers programs related to safe drinking water and on-site septic systems as part of its public health responsibilities. Since its creation, and as part of the King County/ Metro merger in 1996, DNRP has been involved in groundwater issues as part of a mandate for resource management and environmental protection.

Public Health and DNRP worked closely with locally established committees over a 10-15 year period to develop the Groundwater Management Plans for five Groundwater Management areas (**Figure 1**) in King County. Significant groundwater problems that threatened resources had been identified in the five areas and led to the creation of committees to address each distinct geographic area's problems. The King County Council approved the plans in 1998 – which were then certified by the Department of Ecology (DOE) in 2000 — and provided interim funding to DNRP to implement the plans.

With this interim funding, the DNRP program focused on public education and outreach, data collection and management, policy and regulatory development, and coordination between related county efforts affecting groundwater protection. DNRP also developed and strengthened relationships with state agencies – such as (DOE) and the Department of Health (DOH) – and federal agencies such as the Environmental Protection Agency (EPA) and the United States Geological Survey (USGS). DNRP also helped to establish the local groundwater committees, proposed by each Groundwater Management Plan, to coordinate plan implementation.

It was partly in response to this need that the King County Council created an ordinance for a Groundwater Protection Program in King County. The ordinance was adopted in October 2001 and went into effect in December 2001, (the full text of the ordinance is available on the Web at: *http://www.metrokc.gov/MKCC/Code/12-Title%209.pdf.* The ordinance names DNRP as the lead agency for all groundwater-related work within King County. The ordinance identifies specific responsibilities for the program, and directs DNRP to coordinate pursuit of the County's groundwater protection objectives with other County departments, such as Public Health, and federal and state agencies. The ordinance created Groundwater Protection Committees for each of the four Groundwater Management Areas with Groundwater Management Plans, which are certified by the DOE. The ordinance directs DNRP to assist in organizing committees and providing support using available resources.





Current Program

In 2002, the Groundwater Protection Program staff reassessed the Program developing a mission statement and organizational structure that reflects the new direction provided by the Groundwater Protection Ordinance.

King County Groundwater Protection Program Mission Statement

The Groundwater Protection Program provides management, policy, and technical expertise to help protect the quality and quantity of the groundwater resources in King County. The Program seeks to protect the health and viability of its residents who use groundwater for drinking and preserve fish and wildlife habitat by ensuring the replenishment (by way of groundwater contributions) of streams, lakes and wetlands for future generations.

Goals

- Assure that King County exercises all its authority in a fashion that protects groundwater.
- Develop the capability to assess groundwater quality and quantity trends and conditions with the means to evaluate and address them.
- Facilitate stakeholder engagement in groundwater issues and related decision-making processes; build a strong base of support for groundwater protection by encouraging communication and dialogue amongst stakeholders.

Primary Responsibilities

1) Interagency Coordination

Coordinate and collaborate within King County government and with other local, state, federal and tribal agencies in order to: leverage resources, integrate groundwater protection with the protection of all water resources, and integrate groundwater protection with other public health and safety efforts.

2) Groundwater Protection Planning and Plan Implementation

Help local communities to identify groundwater protection needs and address them with local and other resources; integrate groundwater issues with other local planning efforts including growth management plans.

3) Data Collection and Management

Serve as a reliable source of information on the status of King County's groundwater resources, its quality and quantity; develop effective monitoring programs to document trends and provide expert analysis on the conditions of groundwater quality and quantity in King County for planning and other purposes.

4) King County Groundwater Policy

Foster (review, develop, recommend) an effective groundwater protection policy for the King County area.

5) Groundwater Stewardship and Education

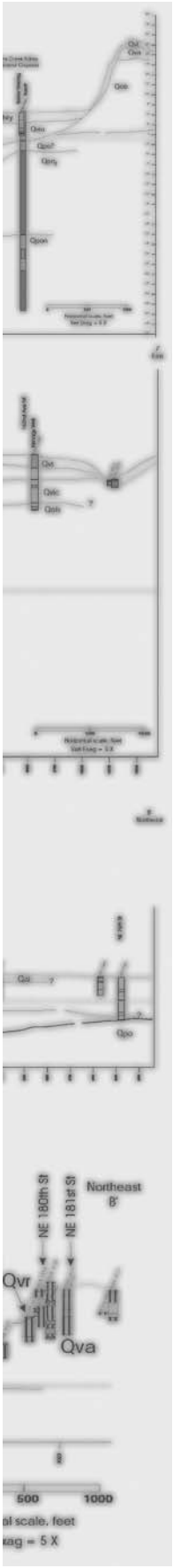
Provide stewardship services related to groundwater protection; communicate to the larger community: the important groundwater issues in King County and what is being done to address them.

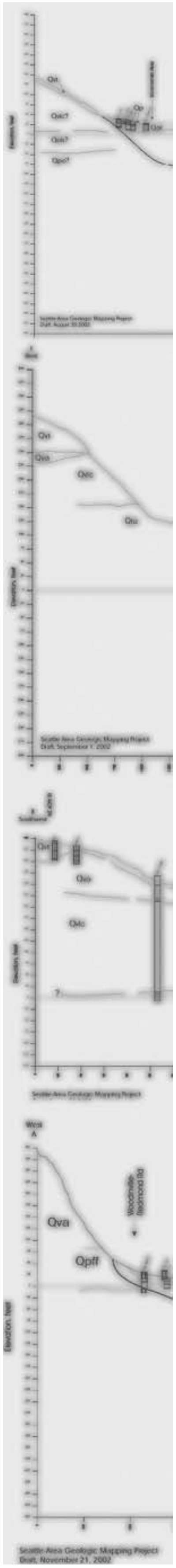
6) Program Administration and Accountability

Perform general administrative activities for the Groundwater Protection Program. Inform decision-makers about important groundwater issues in King County and report on what is being done to address them. Evaluate and develop all funding sources for stable, long-term groundwater protection in King County.

In 2001, the Groundwater Protection Program had residual staffing and funding levels from the, "Early Start" program that was authorized by the King County Council in 1999. This program focused on ambient monitoring, education, and creation of the Groundwater Protection Ordinance.

In 2002, the Program's organization began to shift in light of the Groundwater Protection Ordinance. Most importantly, King County staff facilitated convening the Groundwater Protection Committees, and expanded the groundwater services available. In order to fully address groundwater issues within the geographic area of the County, King County is designing a regional Groundwater Protection Program that will be incrementally implemented with the assistance of the active Groundwater Protection Committees. In 2002, "Early Start" and interim funding sources supported the Program. A stable and dedicated funding source will be necessary to support the provision of groundwater services in the future.

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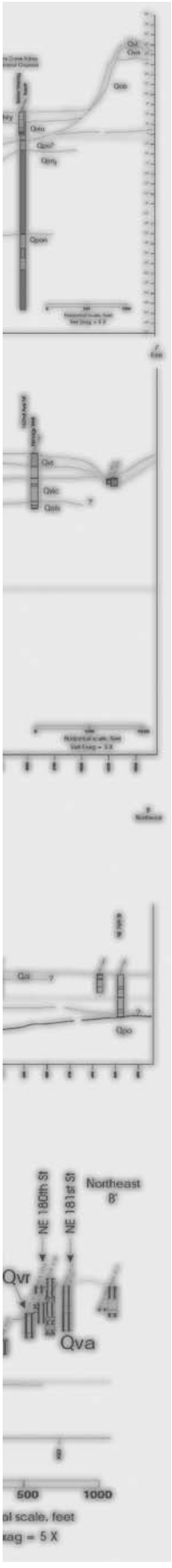
CHAPTER 2:
GROUNDWATER PROTECTION SERVICES IN 2002



As the lead agency for the King County Groundwater Protection Program, the Department of Natural Resources and Parks maintains partnerships with numerous federal, state, and local agencies that are also responsible for aspects of groundwater protection in King County. This report, however, emphasizes the role of DNRP in groundwater protection.

The DNRP's Groundwater Protection services are grouped into five categories discussed in this chapter:

A. Data Collection and Management
B. Education and Stewardship
C. Groundwater Protection Planning
D. Groundwater Policy Activities
E. Interagency Coordination

Note: The sixth area of program service — program administration and accountability — is discussed in Chapter 3.

A. Data Collection and Management

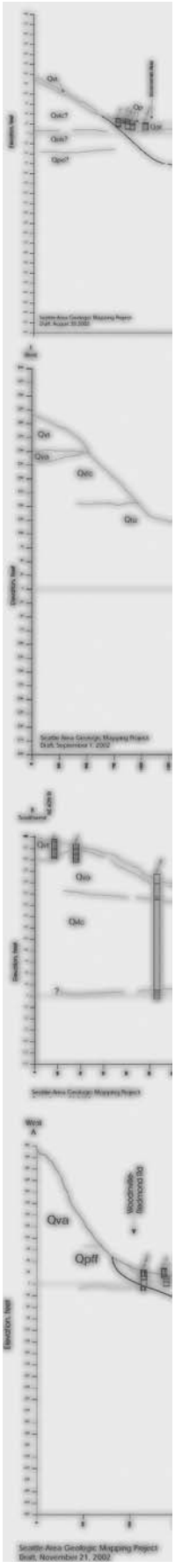
Data collection and management for the Groundwater Protection Program in 2002 included four major accomplishments:

- Development of a Data Plan to guide current and future groundwater data collection. This plan provides a road map for integration and use of County and other source data.
- Evaluation and participation in projects related to groundwater in King County such as the Sammamish River Study, water budgets for watershed planning areas, King County Normative Flows study, and DDES development project reviews.
- Data collection and analysis including a second consecutive year with two rounds of ambient water quality monitoring and volunteer water level monitoring.
- Additional sampling focused on specific water quality issues and areas.

Generally speaking, King County staff continued gathering new data and making existing information more accessible and usable in 2002. Data collection and monitoring, designed to detect changes and trends early, is an integral part of understanding the issues concerning King County's groundwater.

DATA PLAN

King County Staff drafted a groundwater Data Plan in 2002 that will guide future data collection efforts. This Plan outlines recommended activities to meet the overriding goal of protecting and sustaining the groundwater resources of King County. The Plan identifies the overall objectives of the Groundwater Protection Program's data collection and management efforts to supply data and expertise, maintain high scientific



and professional standards, and provide quality service to clients. Lastly, the Plan puts forward a long-term goal of developing a three-dimensional computer model that simulates groundwater movement, and possibly groundwater quality throughout the County. The Groundwater Protection Program will begin implementation of this Plan in 2003, which will mean a reduction in routine sampling, additional investigation of known groundwater quality or quantity problems, and development of increased analytical support for groundwater policy issues.

DATA COMPILATION AND DATABASE DEVELOPMENT

The purpose of the groundwater database is to compile information about groundwater quantity and quality. This information is then compared over time and space and is used to reach conclusions about how and where the resource is changing. The database allows information to be easily extracted for analysis, thus allowing for objective interpretation by the public or the groundwater consulting community.

The Groundwater Protection Program's main tool for managing data is King County's comprehensive database called EQuIS. EQuIS contains information for more than 6,800 locations, including well location/owner information, well log, water level quantity and water quality.

Data has been made available to the public via iMap, an interactive map program, that allows data to be shared visually via the Internet. It can be found online at: *http://www.metrokc.gov/gis/mapportal/iMAP_main.htm* under the map set "groundwater project."

The EQuIS database is used by staff in the Groundwater Protection Program and DNRP's Solid Waste Division Landfill Unit. In order to familiarize other potential users with the systems, the Groundwater Protection Program sponsored an EQuIS training session in 2002 that was attended by staff from similar programs in Snohomish and Whatcom Counties.

In 2002, the Groundwater Protection Program obtained a comprehensive database from the state DOH, of about 80,000 records of water quality data reported to DOH by 1,882 purveyors in King County for the period 1990 to June 2002. Such informal data sharing arrangements extended other state, federal, and local agencies, including:

- drillers' logs for water wells, from the state DOE;
- locations of potential sources of groundwater contamination, from DOE and the state Department of Natural Resources (e.g., mining sites);
- and surface water elevation and flow data, from the USGS.

These data have been integrated with internal data for analysis. The Program intends to update the data on a regular basis and expand the use of external sources of data.

SAMMAMISH RIVER VALLEY GROUNDWATER STUDY

King County's Sammamish Valley groundwater study was designed to collect data and information to use in developing habitat improvement recommendations that are compatible with human uses of the river corridor, including recreation, agriculture, and urban development. In particular, the groundwater study is intended to inform strat-

egy decisions for mitigating flow and temperature problems in the Sammamish River between Lake Sammamish and Lake Washington. The study will also help guide development of reclaimed water projects in the river corridor.

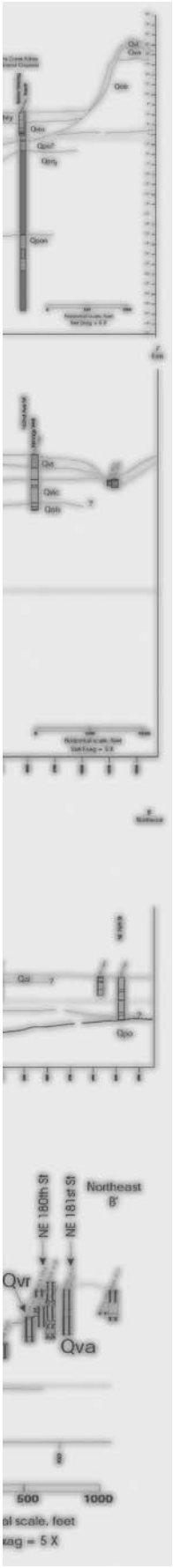
The groundwater study is the result of strategically combining existing data with new data collection activities and partnerships with other agencies and entities. The major focus in 2002 involved developing a database with information from more than 6,000 soil borings, monitoring wells, and test pits that represent more than 115,000 feet (22 miles) of vertical exploration (**Figure 5**). This database, which was developed in cooperation with the Center for Water and Watershed Studies at the University of Washington, contains geologic and hydrogeologic information that was originally obtained by a variety of public entities. These sources include cities (e.g. Bothell, Kenmore, Lake Forest Park, Redmond, and Woodinville), public utilities (e.g. Cross Valley Water District, Northshore Utility District, Seattle Public Utilities) and state and federal agencies (e.g. Washington Department of Transportation, DOE and USGS). The information from this database has been used to develop geologic cross sections that described the subsurface geology and groundwater flow systems in the Sammamish River Valley.

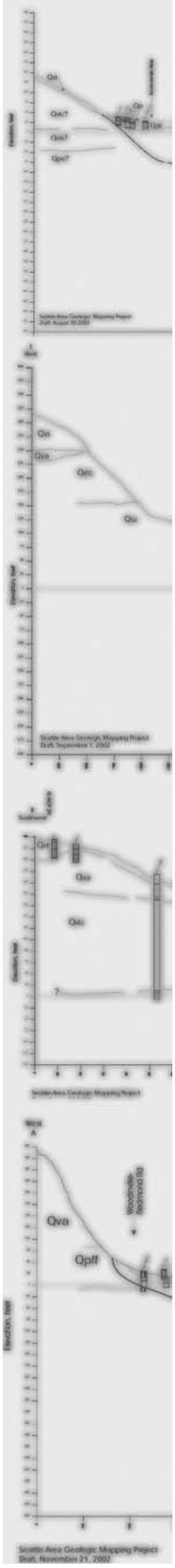
Program staff completed a number of new data collection activities for this project during 2002, which included the installation of 15 new groundwater-monitoring wells in the river valley. These wells will be used to quantify the amount of groundwater flow within the valley, to quantify groundwater-surface water interactions, and to provide water quality data. Several of the new wells were used to conduct groundwater-pumping tests to further quantify the relationship between the groundwater and surface water systems in the Sammamish Valley. These new wells have also been combined with a set of existing wells to form a monitoring network designed to observe long-term changes in groundwater water levels in the valley. Staff also obtained water levels in the Sammamish River and Bear Creek by measuring down from surveyed benchmarks on bridges.

Program staff also completed a series of geophysical surveys, during the summer of 2002, in which electricity and sound waves were observed moving through the subsurface. This approach is particularly useful for identifying subsurface features such as buried channels. Surveys completed in the Sammamish River Valley identified several locations where former channels of the Sammamish River may have been buried. These old channels may be particularly important because they can represent preferred pathways for groundwater flow and are typically well connected, in a hydraulic sense, with the current river channel.

DNRP also partnered with other agencies to benefit the Sammamish study. The DOE Environmental Assessment Program carried out a study of bed inflow/outflow through the Sammamish River Valley from Marymoor Park to Northeast 145th Street, and shared data with King County. The City of Redmond has allowed the use of several existing monitoring wells and the automatic water level measurement instrumentation (transducers/dataloggers) in some of these wells.

The geologic and hydrologic data collected in 2002 will provide key information required for a computer model to describe groundwater movement and groundwater-surface water interactions in the Sammamish River valley. This model will ultimately be used to evaluate the effects of groundwater on the quantity and quality of surface





water in the Sammamish River and to evaluate different strategies and activities for improving river habitat. This model may even become a countywide model used for groundwater protection purposes.

AMBIENT GROUNDWATER MONITORING

The Groundwater Protection Program carried out two series of groundwater sampling at approximately 68 wells and springs in four of the areas covered by the Ground Water Management Plans. The samples were analyzed by the King County Environmental Laboratory for a long list of elements, including conventional parameters and inorganic parameters. A few samples were also analyzed for an extensive list of organic compounds (to complete coverage for a study begun in 2001). Program staff chose the locations for sampling to replicate the wells sampled during the development of the Ground Water Management Plans in 1989 - 1995. During the 2002 sampling, measurements were taken of water levels (where possible) and of field parameters. The data were analyzed for long-term changes in water quality by comparing the old data with the new.

HAS GROUNDWATER QUALITY CHANGED?

The data from King County Ambient Monitoring were analyzed for the *2002 King County Benchmark Report* to address Environmental Indicator 15,"Changes in groundwater levels and groundwater quality." The analysis focused on three chemicals — arsenic, nitrate, and lead — considered of greatest concern for human health in King County because the maximum concentration of each of these chemicals, in many recorded samples, was over half the health-based Drinking Water Standard. The analysis for each of the wells compared the previous (1989 - 1995) and the present (2001 - 2002) results for concentrations of these chemicals. On average, concentrations of these three chemicals in King County groundwater in these areas have stayed the same or dropped during the time between the rounds of samples, with the exception of nitrate levels on Vashon-Maury Island (see below). This indicates that groundwater quality in these parts of King County, for these critical chemicals, has generally improved in recent years.

Water quality data obtained from the state DOH, which includes data reported by large (Group A) Public Water Systems, during 1989 - 2002 generally support the same conclusion (see **Figure 4**). This data set covers a greater geographic area than the ambient data set and provides a countywide perspective. King County staff applied simple statistical analysis to this data set, using only those wells that had at least three nitrate samples in each half of the period covered by the DOH data. The map shows wells with either an increase or decrease (or no change) in nitrate concentration. Each DOH source, where the average concentration since 1997 was more than one standard deviation higher than the average before 1997, is shown as having increased over the decade.

Figure 4 shows the changes in nitrate concentration in the Ambient Groundwater Monitoring wells, following the same simple statistical analysis.

Figure 4 also shows locations from either data set (DOH or KC Ambient) that had a nitrate sample over 5 mg/l, or half the Drinking Water Standard at any time during the study period.

There were too few public water supply sources within DOH data for King County that had analytical results above detection limits to be able to draw conclusions about trends for lead and arsenic. See below for more information regarding arsenic levels.

WHERE HAS LOCAL WATER QUALITY CHANGED?

Nitrate concentrations have increased in some ambient monitoring wells on Vashon, with some wells having triple the concentration levels of earlier samples. The increases on Vashon were mainly in shallow wells, and occurred mostly in three areas on the island. The maximum concentration in any well was about 5 mg/l - the Drinking Water "trigger level". This is half the maximum amount allowed under Drinking Water standards, and the level at which additional sampling by the system is "triggered" under federal and state health regulations. King County staff conducted focused nitrate sampling in additional domestic wells on Vashon and found similar levels of nitrate. There are several potential causes of these higher concentrations of nitrate — including agricultural practices (e.g. excessive application of nitrate fertilizer or animal waste), clearing of vegetation (e.g. decaying organic materials release nitrate), or releases from septic systems. The DOH data also shows higher nitrate concentrations generally in shallower wells on Vashon Island, though it does not clearly show the same tripling of levels as in the ambient monitoring wells. As seen in **Figure 4**, there is no obvious clustering of locations where nitrate levels have increased, but this may require further investigation, particularly in South King County, where DOH data also indicate substantial increases in some wells.

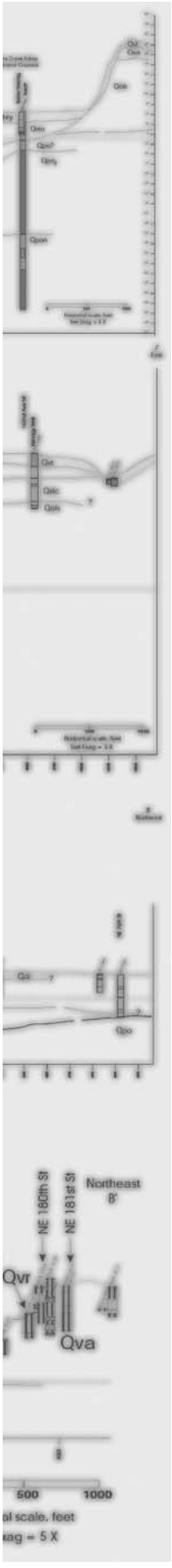
Arsenic is of concern in King County because it is a known carcinogen, and is found to exceed the Drinking Water Standard (10 ppb) in many King County groundwater locations, as shown in **Figure 3**. The data in **Figure 3** is derived from both King County's Ambient Monitoring and the DOH database. Many of the highest concentrations of arsenic are found in the East King County area or in the foothills of the Cascade Mountains, where bedrock often is found closer to the surface. It is likely that this element is leached into the groundwater from naturally occurring geologic materials, and not a result of surface contamination.

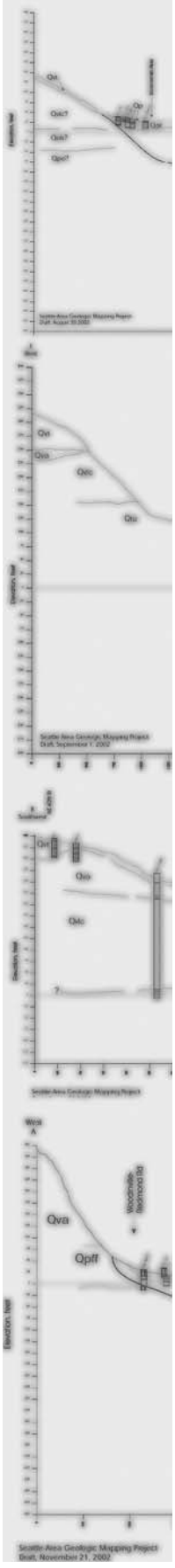
WATER LEVEL MEASUREMENT

Water level measurements of the water table, or aquifer water level, are essential to understanding groundwater for several reasons. Groundwater elevations show groundwater flow direction (from higher water levels to lower), which is important for determining appropriate protective measures on land. Variations in water level indicate the groundwater response to recharge. Water levels are also an indication of how much water is stored within the aquifer, and can show trends in groundwater depletion.

The Groundwater Protection Program monitored water levels in approximately 50 accessible wells as part of the Ambient Monitoring described above. King County staff took measurements at least twice in 2002 (similar to 2001). In a few wells, staff took a total of six measurements. In addition, as part of the various focused sampling efforts, staff took water level measurements to locate the well accurately using a Global Positioning System and obtain a groundwater elevation estimation.

In May 2001, DNRP recruited and trained 25 Vashon-Maury Island citizens to measure





water levels in their private and public groundwater wells. In 2002, the volunteers provided 130 measurements in 23 wells.

Figure 2 shows the current assessment of groundwater flows in King County. It is primarily comprised of information gathered (1989 - 1995) for the Groundwater Management Plans, supplemented in a few areas by newer data. The figure shows the general pattern of groundwater movement. Arrows depict groundwater flow.

Two types of aquifers are shown on **Figure 2**: "upland" and "alluvial valley." Groundwater recharge in the upland areas penetrates to glacial "outwash" aquifers, which occur in Qva soils (or sand and gravel); water in these aquifers flows down gradient to the valleys, and discharges to alluvial aquifers. Alluvial aquifers are found in Qal soils (or sand, silt, gravel, and cobbles) in the valleys. The alluvial aquifers, and the rivers they follow, carry the water to Puget Sound. Much of King County has bedrock at or near the surface (shown as light brown areas), and this material prevents recharge.

Water level data can be easily analyzed by comparing past and present average levels, to see if levels have risen or fallen. King County compared data from pre-1997 sampling to data from 1997 to the present because it provided relatively equal numbers of data points to evaluate. This analysis was done using all the wells for which there were at least two measurements both before and after January 1997. Wells with a standard deviation of more than 10 feet were dropped from the analysis (about 13% of total sources). Water levels were considered to have risen when the post-1996 average was higher than the pre-1997 average. Under this simple analysis, 22 wells have higher water levels, and 17 are lower with an increase of about 0.6 foot on average.

As more data are obtained, the analysis can be enhanced to include seasonal fluctuations, which will avoid overly influential summer low readings in the old or new data that may lead to a false conclusion. The evaluation of the water levels should be related to precipitation trends, since some of the decreases may be due to lower precipitation rather than to over-pumping or increased impervious surface. An analysis should also be done with regard to the location of the well — whether it is a gradient incline or decline in the aquifer and the relation to its depth or that of the aquifer it is tapping.

WHERE HAVE GROUNDWATER LEVELS CHANGED?

King County applied the analysis described in the previous section to the wells located within each of the Ground Water Management Areas with certified plans. Of the four areas, two showed an average increase in water levels and two showed an average decrease. The two increased levels were in Redmond-Bear Creek (nine wells higher, one lower, and an average increase of 1.74 feet) and Vashon - Maury Island (8 wells higher, four lower, and an average increase of 1.13 feet). Reduced levels occurred in East King County (3 wells higher, 7 lower, and an average reduction of 0.30 ft) and Issaquah Creek Valley (2 wells higher, 5 lower, and an average reduction of 0.70 ft).

FOCUSED SAMPLING

In addition to the Ambient Groundwater Monitoring, DNRP staff conducted focused sampling in several areas of known concern and where additional data was needed for King County or regional water planning needs. Examples include the sampling on

Vashon-Maury Island (for nitrate or for any contaminants near the Vashon Landfill), and along the Sammamish River.

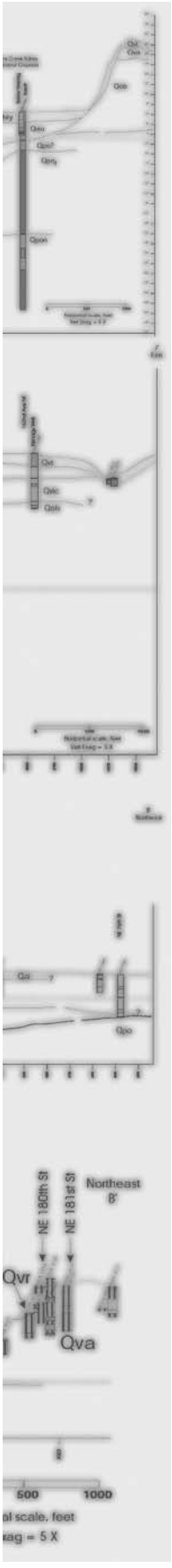
VASHON-MAURY ISLAND FOCUSED SAMPLING

In 2002, DNRP conducted sampling at 17 private wells in areas with apparently elevated nitrate levels and in 11 domestic wells located around the landfill. No evidence of contamination originating from landfills was found. The results of the nitrate sampling are described on pp. 12-13.

OTHER GROUNDWATER DATA EFFORTS

Program staff also supported other County data projects related to groundwater. Staff are working on:

- King County's Normative Flows Project - This study is investigating current stream flow conditions and their capacity to support natural processes. Program staff have helped to calculate the groundwater contribution to base flows in the systems under investigation.
- Managed Water Studies - These studies develop water budgets for basins of interest (Water Resource Inventory Area [WRIA] 8 was the focus in 2002) and calculate groundwater contributions to the total basin water supply.
- Green Water Quality Study & Sammamish Washington Analysis and Modeling Project (SWAMP) - These studies include modeling of groundwater and surface water interaction within WRIA 9.
- Evaluation of new development proposals - Program staff work with King County's Department of Development and Environmental Services to review land use applications and proposed new development that may affect groundwater resources.
- Special Data Requests - Staff respond to special requests for specific data. These requests come from the general public and utilities, as well as the consulting community.



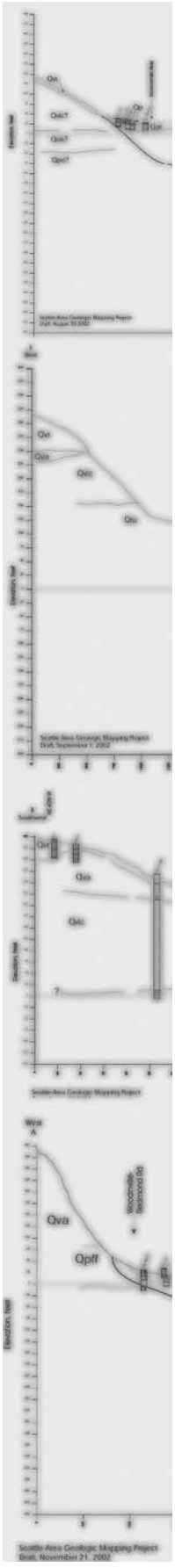
B. Education and Stewardship

The objectives for the education and stewardship element of the Program are to provide stewardship services related to groundwater protection and to communicate to the larger community the important groundwater issues in King County and what is being done to address them.

The Groundwater Education Program uses classroom-style presentations and public outreach to help students and adults learn more about groundwater quality and quantity. Students take part in classroom activities as well as inventories of their own water use at home. The general public is educated through groundwater presentations made at community fairs, festivals and environmental education opportunities.

CLASSROOM PRESENTATIONS

The Program includes some basic educational pieces. For example, Program staff visit classrooms, using an interactive skit to teach children about the water cycle and a



groundwater model to show the elements of conservation and contamination. Students also conduct an inventory of their home water use as part of the lesson on groundwater conservation and contamination. During 2002, DNRP staff made presentations to more than 4,000 students in 51 schools, in 12 school districts, as shown in **Figure 6**.

FESTIVALS

Program staff conduct community outreach and education for the Groundwater Protection Program primarily through exhibits, discussions and the dissemination of materials at community and environmental events. Interactive exhibits allow citizens the opportunity to discuss groundwater with Program staff. A groundwater model shows the relationship of life above the ground to the water below the ground and brochures covering an array of groundwater related topics are on hand. The King County Groundwater Protection Program provided an education booth at a number of fairs and festivals in 2002. **Figure 6** shows the location of these events.

TECHNICAL PRESENTATIONS

The Groundwater Protection Program also provides technical presentations tailored to the interests of specific groups, such as professional societies, public organizations, or ad hoc groups. This element of the Program is still under development. In 2002, Program staff provided several presentations to community groups. In 2003, the Groundwater Protection Program will be looking for more education opportunities, and expects to set up a technical speakers bureau to provide a broader service.

WEB-BASED MATERIALS

In 2002, staff at DNRP maintained an educational Web page on the King County Web site that includes resources for teachers, information for the young hydrologist, stewardship suggestions, and links to associations, agencies, and other stakeholders interested in protecting groundwater. Enhancing learning opportunities through this medium is planned for 2003.

ENVIRONMENTAL BENCHMARKS REPORT

In 2002, staff at DNRP produced a summary of groundwater quality and quantity conditions for inclusion in the County's Benchmark Report. This annual report is available online at: *http://metrokc.gov/budget/benchmark/bench02/*. It summarizes environmental, social, and economic conditions in the County.

PUBLIC INQUIRIES

The public is the ultimate client for the DNRP Groundwater Protection Program. While much of the daily interactions of Program staff members is internal, or with colleagues from other agencies, the job of groundwater protection is primarily accomplished through the involvement and commitment of the general public.

Involvement requires two-way communication – informing the public about groundwater in King County and efforts to protect it, and hearing their concerns. Other sections in this Annual Report discuss some of the methods that provide communica-

tion: the Groundwater Protection Committees, Education and Outreach, and supplying data via the iMap application. Beyond the iMap page, DNRP has a number of resources available via the Internet. DNRP's Groundwater Protection Internet site has attracted significant interest — in 2002 it received 7,395 visits — roughly more than 20 visits per day. In 2002, Web pages about the new Groundwater Protection Committees, various technical studies and reports, and the children's videos, *The Adventures of Little Drip* and *The Flow from Below*, were among the most popular.

Because the Web site includes staff contact information and the DNRP Web site provides an online form for the public's questions and comments, the Groundwater Protection Program receives inquiries directly from the public. In 2002, the Program received more than 100 public inquiries, many of which are from the technical community requesting information about wells, water levels, or groundwater quality in a particular area. In this way, the Program serves as a "clearinghouse" for groundwater data for the region. Other inquiries come from individuals requesting well water sampling, regulation information, or perhaps sharing information about an observed danger to groundwater.

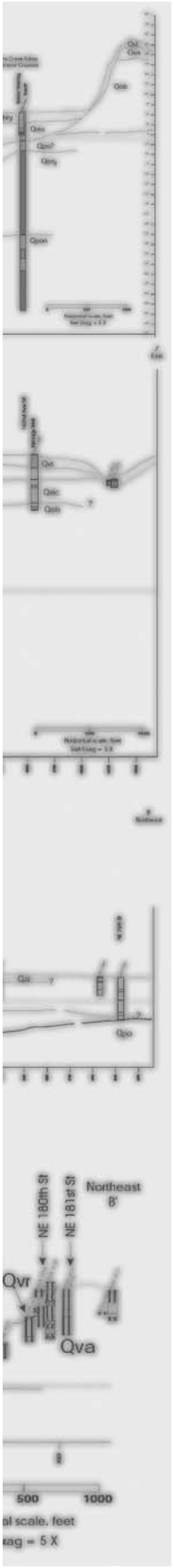
Some of the more unusual topics in 2002 were:

- "I'm a college student originally from Seattle with an assignment: where does the water come from in my home town?"
- "What do I do about groundwater in the crawl space under my house?"
- "I'm about to move to Puyallup — is the water very hard there?"

DNRP groundwater protection staff respond as best they can to each of the inquiries they receive, often connecting the people to other staff who can better help, such as:

- Public Health for questions about private well construction or testing.
- Stormwater Services regarding concerns about pollution caused by a human activity.
- The Washington Department of Ecology for information about construction of specific wells contained in their well logs.

The Groundwater Protection Program uses these inquiries to enhance information available on the Web and make information more easily available to the public.

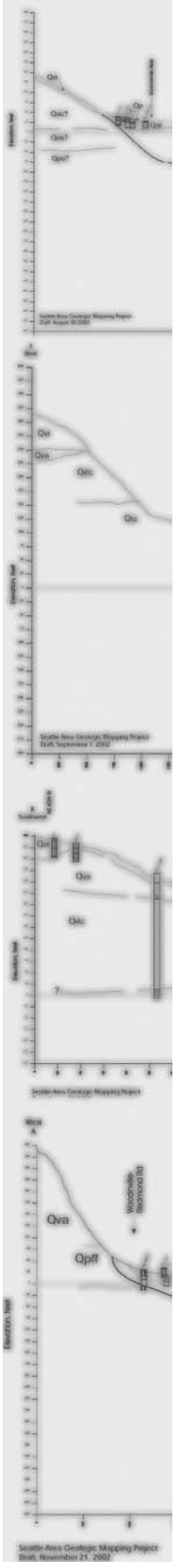


C. Groundwater Protection Planning

GROUNDWATER PROTECTION COMMITTEES

King County Council has established four Groundwater Protection Committees for the following areas: Vashon-Maury Island, East King County, Issaquah Creek Valley, and Redmond-Bear Creek Valley, each of which has a certified Groundwater Management Plan. Under the provisions of the Groundwater Ordinance, each of the four committees is to remain in existence through December 31, 2004.

The King County Council did not create a committee to cover the South King County Ground Water Management Area. However, there will be a Draft Groundwater



Management Plan developed in the near future. This effort is being led by the South King County Groundwater Advisory Committee, using a DOE grant provided to the South King County Regional Water Association.

In 2002, Program staff worked with local stakeholders, County Council Members and the County Executive to identify candidates to serve on the groundwater protection committees. By the end of 2002, all four groundwater protection committees had membership appointed by the County Executive and confirmed by the County Council. Members represent local governments, water and sewer purveyors, business, agriculture, and environmental and residential well users. Each tribal nation with federally recognized rights within a groundwater management area is invited to participate, as well. The state Departments of Ecology and Health, adjacent county governments, and Public Health – Seattle & King County are also invited to participate as non-voting members.

Each Committee has a number of responsibilities spelled out in KCC 9.14. Generally their work includes:

- Advising the King County Executive and County Council on groundwater activities and issues and keeping elected officials and their organizations informed;
- Monitoring and participating the implementation of Groundwater Management Plans and developing and recommending modifications to the plans;
- Reviewing and making recommendations on the short- and long-term work plans for regional groundwater needs;
- Coordinating community groundwater needs with local organizations;
- Providing annual status reports on their activities;
- Making recommendations on distribution and use of aquifer protection funds;
- Recommending changes to county planning policies affecting groundwater protection;
- Recommending services tailored to the unique needs of the local area;
- Providing advice on state groundwater regulation.

The Vashon-Maury Island Groundwater Protection Committee was the first Committee to begin operation, starting in December 2001. The East King County committee began meeting in October 2002 and the Redmond Bear Creek Committee had its first meeting in December 2002. The Issaquah Creek Valley Committee scheduled its first meeting for January 2003.

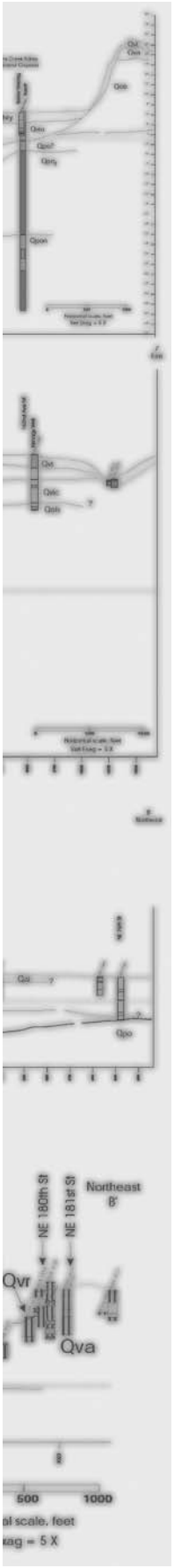
A status report on the activities for each of the Groundwater Protection Committees is included as Appendix A.

D. Groundwater Policy Activities

OBJECTIVES

A key component of the comprehensive Groundwater Protection Program is effective policy and regulation that promotes protection of the County's essential groundwater resources. The King County Groundwater Protection ordinance (codified at KCC 9.14) created the Groundwater Protection Program, established a number of regulatory and policy elements within the Program, and made the Department of Natural Resources and Parks the lead agency for implementation. Policy and regulatory responsibilities fall under the Water Resources Policy Unit within the Director's office. As lead agency, the Department of Natural Resources and Parks is responsible for regulatory and policy activities such as:

- Coordinating groundwater policy activities with state and federal agencies, tribes, local governments, water purveyors and users, and participating in such activities as Endangered Species Act studies and plans where groundwater may be an issue.
- Coordinating groundwater policy activities within King County with Public Health, the Office of Regional Policy and Planning, and the Department of Development and Environmental Services.
- Recommending possible changes in the areas of public health regulation, countywide planning policies, land use practices (e.g., critical recharge area protection) and tracking of groundwater trends in environmental benchmarks.
- Developing comprehensive, integrated policies around groundwater protection, surface water, stormwater, wastewater, and reclaimed water.



Major Groundwater Protection Program regulatory and policy activities

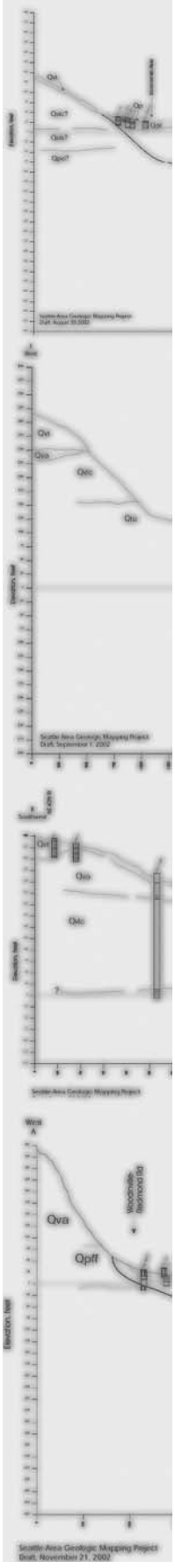
COMMITTEE MEMBERSHIP APPOINTMENTS AND CONFIRMATIONS

Three new Groundwater Protection Committees were appointed and confirmed in 2002: East King County, Redmond Bear Creek, and Issaquah Creek Valley.

Program staff worked with County Council Members, community groups and local governments to solicit nominations for the Groundwater Protection Committees. Program staff provided support to the King County Executive and King County Council in the consideration, appointment and confirmation of committee members.

SALMON RECOVERY AND WATERSHED PLANNING

In 2002, Program staff worked with Water Resource Inventory Area (WRIA) Planning Committees to identify and investigate the groundwater related aspects of salmon recovery. Projects such as the Sammamish River Groundwater Investigation in WRIA 8 provide information that helps policy makers decide how best to protect ground and surface water for the benefit of salmonids and other species. In 2002, Program staff also began to provide support to Watershed Planning efforts in WRIAs 15, 9 and 7, which will focus on water quantity and water supply including instream flows and aquifer levels. Program staff also supported the Governor's Central Puget Sound Water Initiative, which aims to develop a regional approach to water resources management.



CRITICAL AQUIFER RECHARGE AREAS (CARA)

Critical Aquifer Recharge Areas are defined as a Critical Area under the State's Growth Management Act. **Figure 7** shows County CARA as defined under the current code. State law requires King County to review, and update if necessary, its CARA provisions in order to ensure that the County is adequately protecting aquifers that are used to supply potable water. In 2002, DNRP staff began evaluating the County's current CARA code and set a schedule for completing a Best Available Science review of the code. This review is likely to lead to a proposal in 2003 to amend the CARA portion of the County's Critical Areas Ordinance. DNRP expects to engage the Groundwater Protection Committees and other stakeholders in this review.

REVIEW OF POLICY RECOMMENDATIONS FROM GROUNDWATER MANAGEMENT PLANS

Program staff began working with the Groundwater Protection Committees to prioritize recommendations for King County policy change or improvements. Recommendations are derived in part from the Groundwater Management Plans. This review is part of the comprehensive review by each Committee of its Groundwater Management Plan to determine which portions of the plan to implement, on a priority basis, and how to revise and update the plan.

COORDINATION WITH OTHERS ON GROUNDWATER POLICY

The Groundwater Protection Program involves coordination with a broad array of other agencies on groundwater policy and services. See the Interagency Coordination section below for more detail.

E. Interagency Coordination

An effective and efficient Groundwater Protection Program requires coordination of efforts by DNRP with agencies and entities across jurisdictional authorities with the goal of efficient and effective use of public resources and providing high-value groundwater protection services to King County residents.

As lead agency for the Groundwater Protection Program, the Department of Natural Resources and Parks is responsible for interagency coordination activities such as:

- Coordinating groundwater activities with state and federal agencies, tribes, local governments, water purveyors and users, and participating in such activities as Endangered Species Act studies and plans where groundwater may be an issue.
- Coordinating groundwater activities within King County Department of Natural Resources which includes working with the Wastewater Treatment, Solid Waste, and Water and Land Resources Divisions.
- Coordinating groundwater activities with other King County Departments which includes Public Health – Seattle & King County, the Office of Regional Policy and Planning, and the Department of Development and Environmental Services.

KING COUNTY AGENCIES

The DNRP Groundwater Protection Program is a cooperative effort between agencies underneath the King County umbrella. In some cases, the coordination involves a service such as a technical review to the Department of Development and Environmental Services (DDES), groundwater investigation work on a Wastewater Treatment Division project, or land surveying work by the Department of Transportation for a groundwater project. Often, coordination efforts result from overlapping services to the public.

DEPARTMENT OF NATURAL RESOURCES AND PARKS

Program development and administration, and groundwater policy, are managed by the Water Policy Unit, within the Director's Office of the Department of Natural Resources and Parks.

WATER AND LAND RESOURCES DIVISION (WLRD)

Groundwater data collection, management and analysis efforts take place in the Scientific and Technical Support area of the Science, Monitoring and Data Management unit in the Water and Land Resources Division.

Groundwater Outreach and Public Involvement is mostly performed in conjunction with other outreach efforts in the Land and Water Stewardship Services unit in the Water and Land Resources Division.

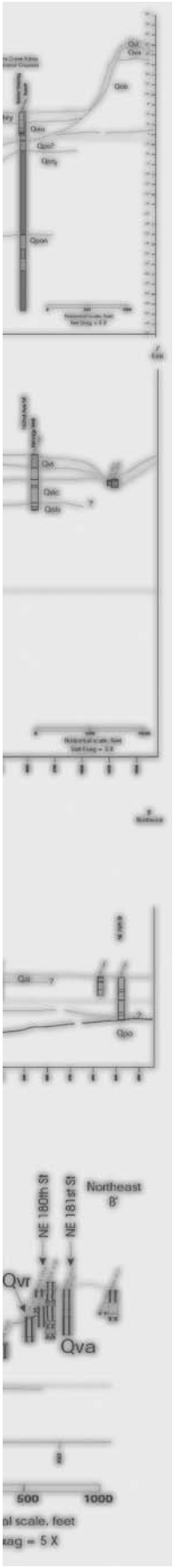
Groundwater Protection Program staff also work with other units of the Water and Land Resources Division, including: Basin Stewards, surface water monitors (stream gaugers), statistical and analytical laboratory services, Surface Water Engineering Services and Ecological Services, Drainage Investigation and Facilities Maintenance, and Regulations and Compliance.

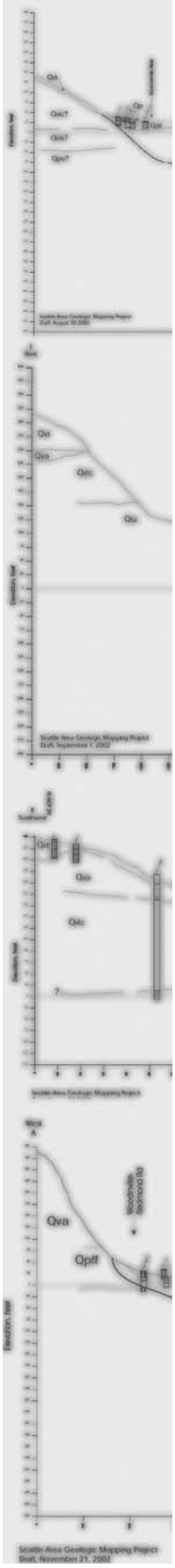
SOLID WASTE DIVISION (SWD)

Program staff coordinate with the Landfill/Environmental Unit of the Solid Waste Division's Engineering Services. WLRD and SWD share the EQuIS database program and support each other on technical issues, training and data sharing. Solid Waste Division employees also participate in the Groundwater Protection Program Committees. Through a partnership with the Solid Waste Division Landfill/Environmental Unit, the Groundwater Protection Program sampled private water supply wells near the closed Vashon landfill site in 2002. DNRP staff also supplied information to SWD regarding wells and wastewater services in the vicinity of the closed Duvall landfill.

WASTEWATER TREATMENT DIVISION (WTD)

Groundwater Protection Program staff work on several projects with the Wastewater Treatment Division (WTD). The majority of the work relates to the Regional Wastewater Services Plan and includes monitoring and modeling projects such as the Green/Duwamish Water Quality Assessment and the Sammamish-Lake Washington Analysis and Modeling Project. Both projects require groundwater data and expertise. Additionally, Program staff are involved in site evaluation for Wastewater's proposed Reclaimed Water facility. Primarily this has involved the Sammamish River Valley Ground-





water Investigation that focuses on the planned location for the Sammamish River reclaimed water pilot production facility.

DEPARTMENT OF DEVELOPMENT AND ENVIRONMENTAL SERVICES (DDES)
Coordination with DDES focuses on projects that involve groundwater and trigger the State Environmental Policy Act (SEPA) review of plans and environmental impact statements. In 2002, Program staff also worked with DDES on evaluating the County's current regulations for Critical Aquifer Recharge Areas and consideration of updating these regulations as part of an amendment to the County's Critical Areas Ordinance.

DEPARTMENT OF TRANSPORTATION (DOT)
The Groundwater Protection Program coordinates with King County's Department of Transportation in sharing data from a number of monitoring wells. DOT survey services provide accurate elevations and locations of monitoring facilities.

PUBLIC HEALTH - SEATTLE & KING COUNTY (PUBLIC HEALTH)
One of the Groundwater Protection Program's most significant partnerships continues with Public Health - Seattle & King County. The two agencies share similar responsibilities. Public Health's concern is with the negative impacts from inadequate or unsafe groundwater (e.g., contamination), and the protection of potable water supply sources; DNRP's goals focus on management of groundwater as part of overall responsibilities for protection and preservation of public resources.

During 2002, staff at DNRP and Public Health met regularly to discuss overlapping issues between the two agencies. These included development and funding of the Operation and Maintenance Program for Public Health's On-Site Sewage (Septic) Systems; re-evaluation of Management Strategies from the four completed Groundwater Management Plans; discussions on scope, management structure and funding for the Groundwater Protection Program; and the sharing of groundwater quality and quantity data.

WATER RESOURCE INVENTORY AREAS (WRIAS)
Major resource management and protection activities are underway as part of salmon recovery planning within each of the Water Resource Inventory Areas (WRIAs) in King County. In 2002, Groundwater Program staff participated in the WRIA technical work related to the interface between stream flows and groundwater.

KING COUNTY AUDITOR
Groundwater Protection staff met with the Auditor's Office to discuss how to implement portions of the Groundwater Protection code.

PROSECUTING ATTORNEY'S OFFICE
The Groundwater Protection Program staff and the Prosecuting Attorney's Office (PAO) work together in support of each group's mandates. The Program provides the PAO with groundwater expertise on legal matters concerning groundwater issues, and the PAO similarly provides legal advice.

METROPOLITAN KING COUNTY COUNCIL
In 2002, the King County Council confirmed membership appointments to three new Groundwater Protection Committees: the East King County, Redmond Bear Creek, and

Issaquah Creek Groundwater Protection Committees. Groundwater Protection personnel also met with staff of the Regional Water Quality Committee.

STATE AGENCIES

King County maintains partnerships with many other governmental agencies. At the state level the Departments of Ecology and Health are two agencies that Program staff work with frequently.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

The Washington State Department of Ecology (DOE) has responsibility for managing the "waters of the State," which includes groundwater. The DOE's Water Resources Program maintains water rights and its Water Quality Program controls groundwater quality. Groundwater Protection Program staff work closely with the Department of Ecology on data and policy issues. This cooperation includes:

- King County's participation along with the Department of Ecology at the State Interagency Groundwater Committee (IGWC);
- Negotiations on the County's Surface Water Management National Pollutant Discharge Elimination System permit (this includes consideration of groundwater impacts from Surface Water Management facilities); and
- DOE's Environmental Assessment Program assistance to the Sammamish River Valley Groundwater study through the placement of mini-piezometers (water level monitors) adjacent to the river.

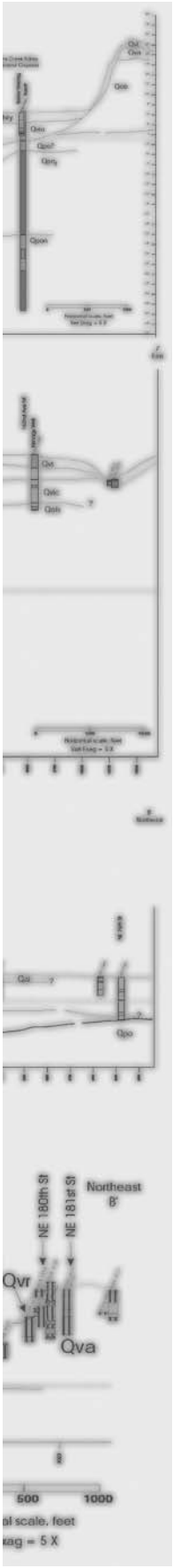
Ecology staff are also non-voting members of each of the Groundwater Protection Committees.

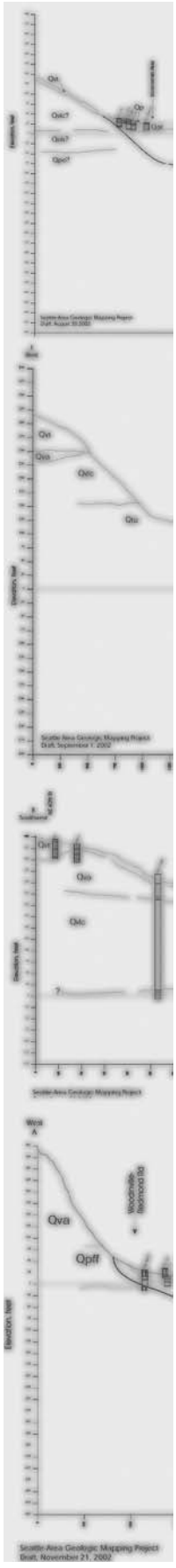
WASHINGTON STATE DEPARTMENT OF HEALTH (DOH)

Groundwater Protection Program staff work with the Washington State Department of Health (DOH) on projects related to the state agency's responsibility for large ("Group A") public water systems across the state, and through participation in the IGWC, which is currently chaired by DOH. Through its water system water quality database ("SADIE"), DOH also provides important data for the Groundwater Protection Program. DOH staff are also a non-voting member of each Groundwater Protection Committee, and occasional presenters.

LOCAL GOVERNMENTS

King County provides governance for the unincorporated portions of the county, and is the provider of regional services for the entire county. In 2002, the Groundwater Protection Program developed and maintained important partnerships with local governments. In 2002, many local cities designated representatives to participate in the Groundwater Protection Committees, which provide a venue for discussion of common issues and concerns related to groundwater protection. Additionally, the cities of Redmond, Issaquah and Duvall shared the use of their water supply wells for ambient water quality sampling and data. Redmond made several wells and data loggers available as part of the Sammamish River Valley Groundwater Study. Redmond staff has also shared information about the process for developing, and the content of, their new proposed groundwater protection ordinance. The Auburn Public Works





Department has coordinated with DNRP regarding its Well Head Protection Area delineation.

SPECIAL PURPOSE DISTRICTS

The primary special purpose districts that the Groundwater Protection Program works with are water purveyors. Program staff frequently meet with a purveyor group on Vashon-Maury Island, instituting a data-sharing program. Additional water districts have also allowed the use of wells for ambient water quality sampling.

OTHER COUNTIES

Many other counties in Washington are developing their own programs to protect groundwater. In 2002, King County continued communications with Snohomish County, Whatcom County, Thurston County, Mason County, and Island County to share data, analysis methods, and policy approaches. Snohomish County has been invited to participate in the East King County and Redmond Bear Creek Groundwater Protection Committees since aquifers in these areas cross into Snohomish County.

CHAPTER 3:
PROGRAM ADMINISTRATION AND ACCOUNTABILITY

As lead agency, the Department of Natural Resources and Parks is responsible for Program administration and accountability activities such as:

- Provide support and serve as liaison to the Groundwater Protection Committees.
- Participate in implementation of the Groundwater Management Plans.
- Develop short- and long-term work plans for the Program.
- Develop a long-term funding strategy to meet the needs of the Program in cooperation with local jurisdictions, water purveyors, special purpose districts, and other interested parties.
- Provide reports and meet other commitments as provided in the Ordinance.

Administration and accountability services are grouped into Program Development and Budget and Staffing.

A. Program Development

GROUNDWATER PROTECTION COMMITTEE LIAISON SERVICES

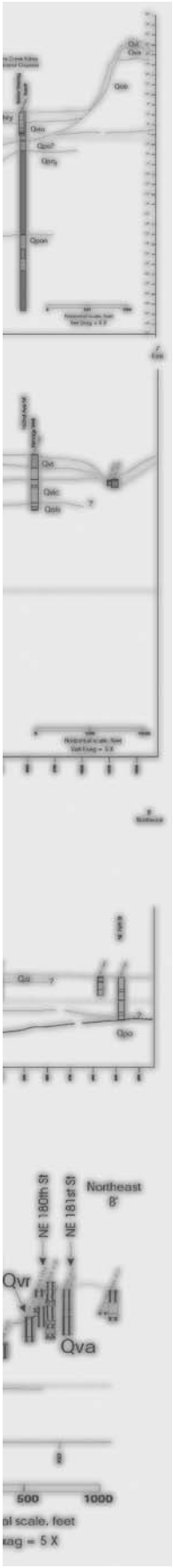
Program staff facilitated the appointment of members to three new Groundwater Protection Committees in 2002; there are now four active committees. As liaison to the Committees, Program staff report on County groundwater activities and solicit comment and feedback from Committee members about the effectiveness of these activities. Additionally, staff coordinate meeting scheduling, facility reservation, development of meeting agendas and meeting notes, and serve as contact point for distribution and receipt of key committee communications.

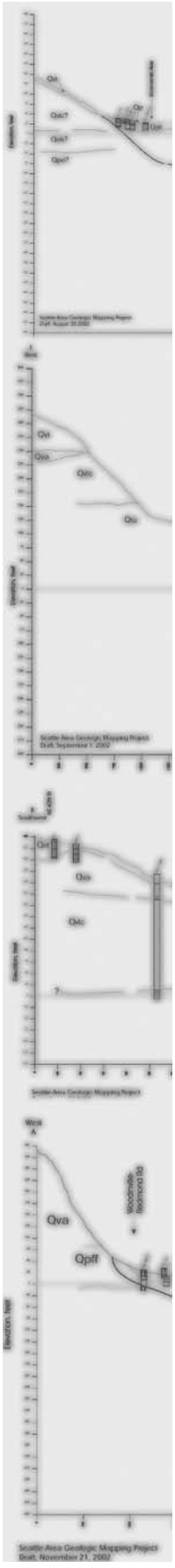
GROUNDWATER PROTECTION PLANS

In 2002, program staff initiated an evaluation and status report on all Management Strategies for which King County was identified as the responsible agency within each of the four completed Groundwater Management Plans. This includes soliciting such status reports from Public Health, DDES, DNRP, Local Hazardous Waste Management Program, and the County Fire Marshal.

GROUNDWATER PROGRAM WORK PLANS

In 2002, Groundwater Program staff initiated an intensive re-evaluation of program activities in light of the long list of recommendations identified in the new Groundwater Protection Program code (KCC 9.14). In November 2002, Program staff developed a draft work plan for 2002-2003, and a general work plan for the Program in future years that would encompass the majority of the code recommendations. In addition to this general work plan, staff developed a more detailed Data Plan that identifies data collection and management priorities for current and future years (as described in Chapter 2, Section A).





GROUNDWATER SERVICES FUNDING

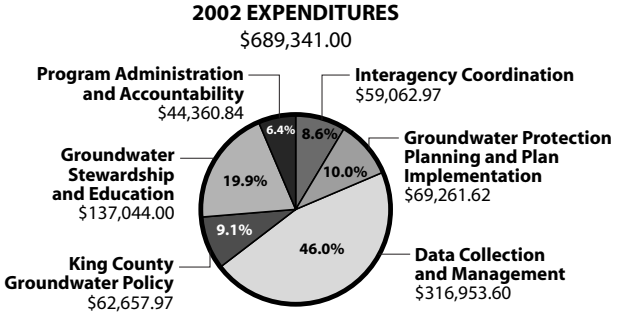
The Groundwater Protection code (KCC 9.14) states that the Program Lead Agency should research possible long-term funding sources for groundwater protection services. In 2002, Program staff began evaluating a variety of funding options for feasibility and appropriateness. In 2003, King County will host a number of meetings with Groundwater Protection Committee Chairs to discuss the scope of the Groundwater Protection Program and appropriate means for funding priority services.

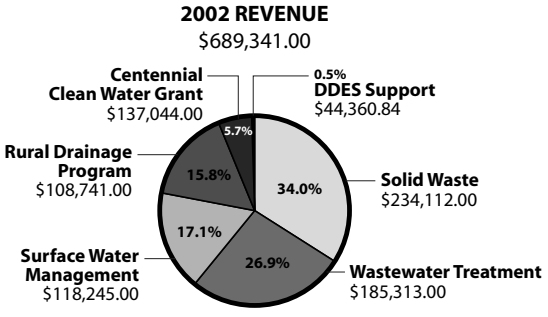
PROGRAM REPORTING

The Groundwater Protection code requires that both the Auditor and the Regional Water Quality Committee (RWQC) review the Program in 2003. In 2002, Program staff presented background information to the RWQC as preparation for the 2003 review. Program staff also met with the Auditor to initiate and prepare for their 2003 review. Other 2002 reporting activity included the Program's Annual Report for 2001 activity (published in April of 2002) and a report on groundwater conditions for inclusion in the 2002 County Benchmarks Report.

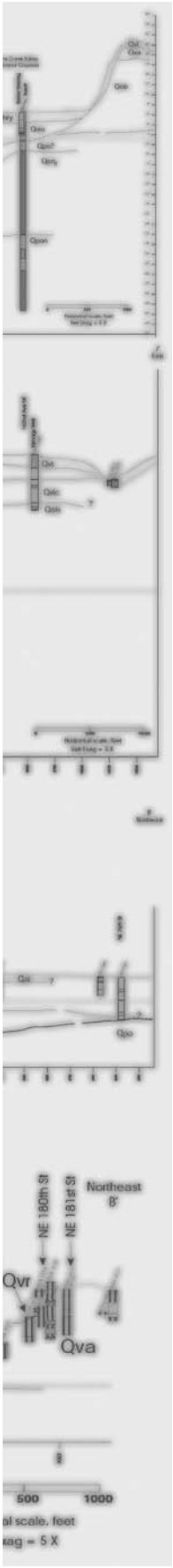
B. Budget and Staffing

The Groundwater Protection Program has existed in King County since 1989 when the Ground Water Management Areas were first identified under state law. Until 1996, the effort was centered in Public Health. Funding was based on state grant money, plus some contributions (mainly in kind) from purveyors in the Ground Water Management Areas. In 1996, the Groundwater Protection Program was moved to the Department of Natural Resources and Parks. When the Groundwater Management Plans were completed in 1998, the King County Council provided the Department of Natural Resources and Parks funding from the County's Surface Water Management fund, with one full-time employee and less than $100,000. Since that time, the Council has appropriated interim funding of approximately $800,000, to DNRP, which has supported a Program with 5.5 employees. In 2002, the total budgeted amount was $919,348; however expenditures were below budget due to staff vacancies. The expenditures for the year and revenue distribution are shown in the charts below.





CHAPTER 4:
PREVIEW OF 2003



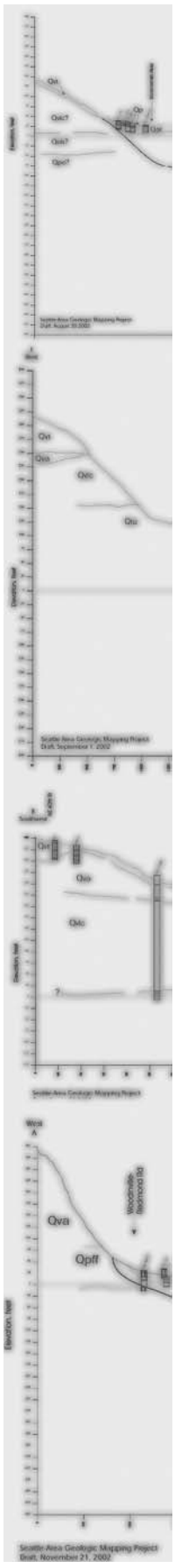
A. 2003 Priority Projects

In 2003, King County will face even greater challenges as it tries to redirect the Program to encompass more of the recommendations from the Groundwater Ordinance and works closely with groundwater interests to identify the most essential groundwater services that are needed in King County. In 2003, major accomplishments should include:

- Review of Groundwater Management Plans to identify recommendations that are still valid and top priority and initiate implementation of priority recommendations from plans.
- Refine the vision for the Program in partnership with stakeholders.
- Assist South King County in completing its Groundwater Management Plan.
- Develop a menu of Program funding approaches, using stakeholder input on priorities and mechanisms that reflect the current economic constraints and pursue the most feasible approaches.
- Revise the approach to source sampling and monitoring to include more focused efforts, and develop a long-term strategy for the ambient monitoring program.
- Begin development of a comprehensive database and groundwater model that will be useful to multiple public and private groundwater interests.
- Begin implementation of additional data management objectives identified in the Program's Data Plan, including increased analytical support for groundwater policy decisions.
- Evaluate existing King County groundwater regulation, particularly the Critical Aquifer Recharge Areas ordinance, and develop revisions if warranted.
- Expand Program education to include initiatives focused on homeowners and how they can protect groundwater resources.

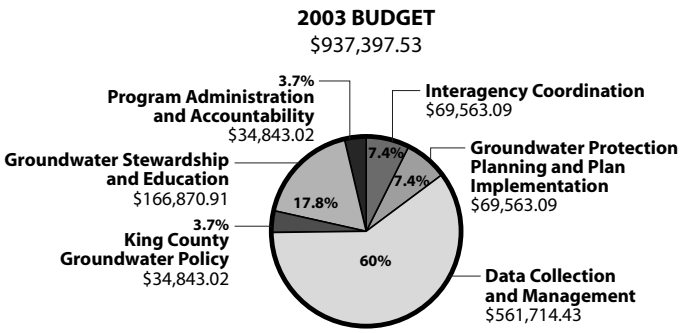
All of this will be pursued in 2003 while recognizing the likely reduction in program funding in 2004. It will be a critical year for building a future for groundwater protection in King County.

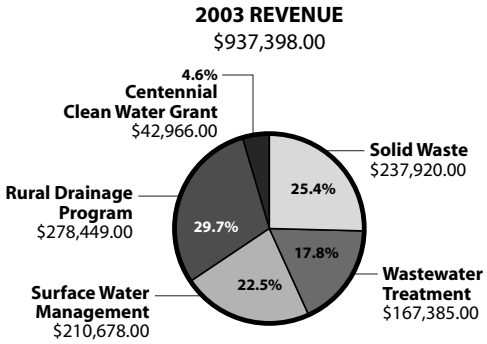
Therefore, developing partnerships will be essential to maintaining and protecting King County's important groundwater resources. During this time of multiple environmental stresses and difficult economic times for local governments, the Groundwater Protection Program is committed to its part in providing value to King County residents through groundwater services.



B. 2003 Budget and Staffing

In 2003, staffing levels are about the same as 2002; 5.5 full time employees are budgeted for the Program. The Program budget for 2003 is $937,397. Pie charts show the distribution of services and revenue sources. Staffing reflects implementation of the priority projects including the Data Plan. The Program Work Plan may be revised during the year to respond to changing priorities and needs.





MAP 1

MAP 2

MAP 3

MAP 4

MAP 5

MAP 6

MAP 7

APPENDIX A

GWPC Status Reports

VASHON-MAURY ISLAND GROUNDWATER PROTECTION COMMITTEE 2002 ANNUAL STATUS REPORT

This committee held its first meeting in December 2001. In 2002 the Committee met nine times, developed and approved its bylaws, and early in the year decided on its priorities. These priorities are:

- Establishing warning levels for contamination.
- Monitoring of water levels and response.
- Developing an education program for failing septic systems.
- Reviewing improved methods for surface water retention including a natural systems approach to drainage management.
- Reviewing and proposing land use compliance legislation to better protect Vashon's aquifer.
- Monitoring and education on gardening/agricultural methods.
- Workshops, newspaper articles, and other community education on groundwater in general, and on the priorities noted above.

To carry out its priorities the Committee has developed a multiyear Work Plan. These priorities were assigned to separate subcommittees which may include members of the community not formally appointed to the Committee.

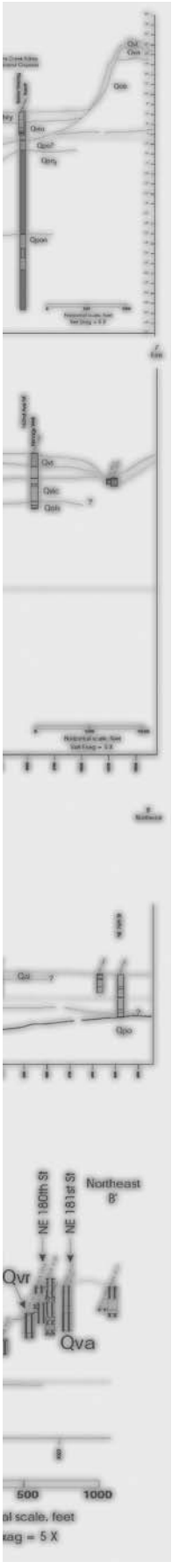
The Warning level/monitoring subcommittee has been working with DNRP and the Departments of Health and Ecology on a proposal for determining how warning levels should be set and what actions should follow. This project is expected to be completed in 2003. An article explaining King County monitoring results to-date was published in a Vashon-Maury Island newspaper.

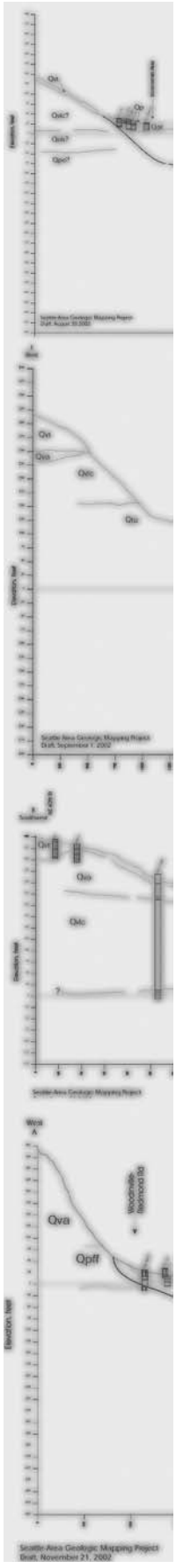
The Septic Systems subcommittee held its first neighborhood meeting to provide better understanding of failing septic systems and their consequences.

The natural drainage systems approach to stormwater management has been an early focus of the Committee's efforts. Preliminary work was accomplished in identifying a pilot project to be constructed in the town of Vashon. A drainage study for the town was done by King County at the request of the Committee. A report to the Committee on the need for sewer district improvements also led to the elimination of some inappropriate stormwater connections to the sewer system.

The Committee has also served as an ad hoc advisory board for the King County Vashon-Maury Island Watershed Steward, Katy Vanderpool and her stewardship activities, including the Rural Drainage and Water Quality Program's Rural Reconnaissance/Island-wide Assessment.

In 2003 the Committee plans to meet six times and to continue to work closely with King County Staff. The Land Use Compliance and Agricultural subcommittees will report in 2003.





The 2002 Committee Members were:

1. James Garrison, original Groundwater Advisory Committee member
2. Ken Fulton, Water Purveyor, Water District 19
3. Laura Wishik, Residential Well User
4. Emma Amiad., Business Owner, Amiad & Associates Real Estate
5. Martin Nyberg, Commercial Agriculturist
6. John Gerstle, Unincorporated Affairs Council, Vashon Community Council
7. James English, Vashon Chamber of Commerce
8. Donna Klemka, Local Environmental Organizations, Vashon Land Trust

Others:

Doug Wood, Washington Department of Ecology

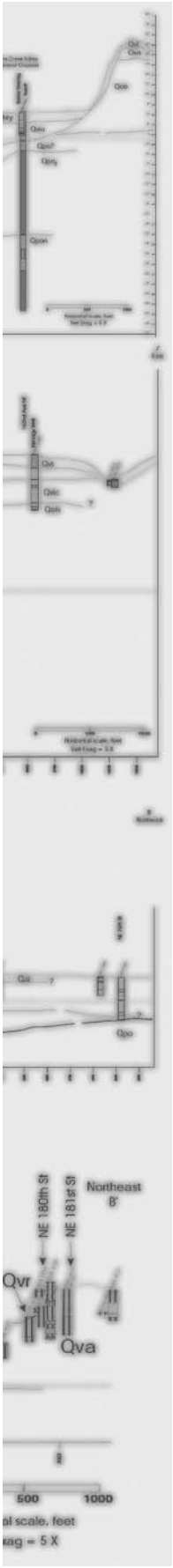
REDMOND / BEAR CREEK GROUNDWATER PROTECTION COMMITTEE 2002 ANNUAL STATUS REPORT

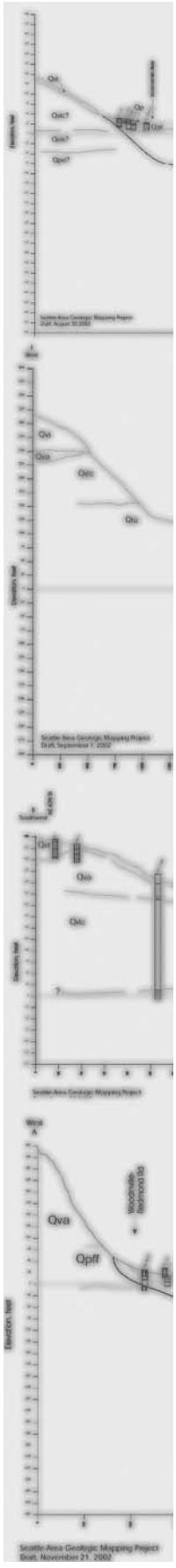
Members of the Redmond / Bear Creek Groundwater Protection Committee (Committee) were appointed by King County Executive Ron Sims in September 2002 and confirmed by King County Council in October 2002. The County Code creating the King County Groundwater Protection Program (King County Code 9.14) requires each of the Groundwater Protection Committees to provide an annual status report on the following:

- Implementation of Groundwater Protection Services in King County;
- Implementation of the certified Groundwater Management Plan, including groundwater protection activities of the cities, special purpose districts, sewer and water utilities and associations, and groundwater purveyors within the groundwater management area;
- Efforts to develop inter-local agreements relative to implementation of regional groundwater protection services; and
- Trends in groundwater issues.

The Committee held its initial meeting on December 3, 2002 at the Redmond Technology Center. At that meeting, the Committee:

- Held informal introductions, and statements of priorities and objectives.
- Distributed copies of the RBC Groundwater Management Plan Management Strategies and Area Characterization.
- Discussed the background and development process for the RBC Groundwater Management Plan.
- Reviewed other groundwater protection activities at the state and regional levels.
- Held a lively discussion on the quality and timeliness of available science.
- Discussed local groundwater initiatives from cities, water districts and businesses.
- Established a schedule of regular meetings.
- Selected a Chair (Michael Johnson) and Vice-Chair (Gareth Grube).
- Discussed relationship between groundwater and surface water, and the need to view the groundwater protection issues in light of the entire hydrologic cycle.
- Agreed to review draft bylaws that would be distributed by Sarah Ogier, Staff Liaison.





Committee Members

1. Bertha Eades, Groundwater Advisory Committee
2. Laura Szentes, Northeast Sammamish Sewer and Water District
3. Roy Bingman, Union Hill Water Association
4. Michael Johnson, Genie Industries
5. Geoff Clayton, Bear Creek UAC
6. Joan Cabreza, Residential Well User
7. Judy Jewell, Redmond Chamber of Commerce; Owner of Olympian Pre-Cast
8. Gareth Grube, Councilmember City of Woodinville
9. Terry Lavender, Environmental Organizations

Others

Jon Spangler, City of Redmond (Mr. Spangler was formally appointed to the Committee in 2003)
Jay Cook, Washington Department of Ecology

The initial meeting established the Committee's structure and commitment to implementing the King County Groundwater Protection Program. Initial efforts will be oriented towards identifying and prioritizing tasks, and determining resources available to accomplish these. Because the committee met only once in 2002, most effort was directed at gathering background information on the complex history and groundwater issues in the basin, as well as organizational structure of the committee. For the purposes of the Annual Report, the results for 2002 are limited to the creation of the Committee itself. The Committee expects to have a high level of activity in 2003, and anticipates a more complete report of the groundwater status in the basin for coming year.

EAST KING COUNTY GROUNDWATER PROTECTION COMMITTEE 2002 ANNUAL STATUS REPORT

Members of the East King County Groundwater Protection Committee (Committee) were appointed by King County Executive Ron Sims in August 2002 and confirmed by King County Council in September 2002. The County Code creating the King County Groundwater Protection Program (King County Code 9.14) requires each of the Groundwater Protection Committees to provide an annual status report on the following:

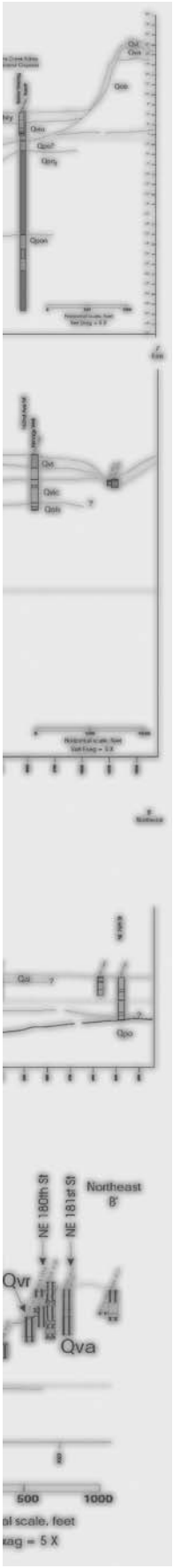
- Implementation of Groundwater Protection Services in King County;
- Implementation of the certified Groundwater Management Plan, including groundwater protection activities of the cities, special purpose districts, sewer and water utilities and associations, and groundwater purveyors within the groundwater management area;
- Efforts to develop inter-local agreements relative to implementation of regional groundwater protection services; and
- Trends in groundwater issues.

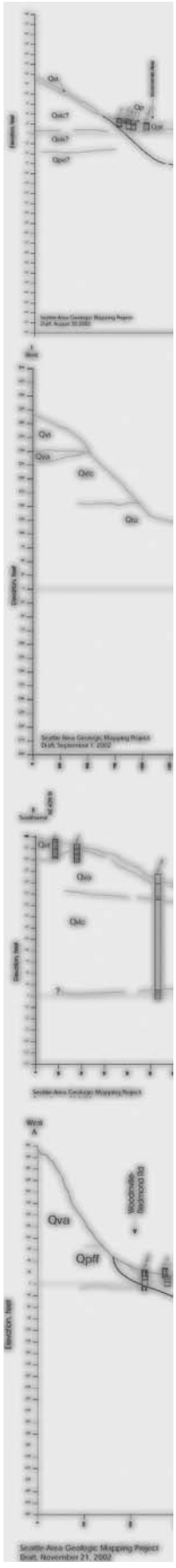
The Committee held its initial meeting on October 17, 2002 at the Carnation Fire Hall. At that meeting, the Committee:

- Held informal introductions, and statements of priorities and objectives.
- Distributed copies of the EKC Groundwater Management Plan Management Strategies and Area Characterization.
- Discussed the background and development process for the EKC Groundwater Management Plan and the County Groundwater ordinance.
- Requested each responsible entity to review the management strategies from the Plan and prepare a status report on their progress.
- Selected a Chair (Dick Jones) and Vice-Chair (Bob Pancoast).
- Discussed Critical Aquifer Recharge Areas (CARA) and the possibility of revising the County's CARA code.
- Discussed the new arsenic rule that lowers maximum contaminant level.
- Agreed to review draft bylaws that would be distributed by Sarah Ogier, Staff Liaison.

The Committee held its second meeting on November 7, 2002 at the Carnation Fire Hall. At that meeting, the Committee:

- Reviewed the management strategies from the Plan and heard status reports from each of the responsible entities.
- Discussed possible options and topics for future guest speakers.
- Discussed the need to have other valley cities participate.





Committee Members

1. Dick Jones, past Chair of Groundwater Advisory Committee Member
2. Bob Pancoast, EKC Regional Water Association
3. Robin Boynton, Residential Well User
4. Terri Divers, Fall City Water District
5. Jim Dorsey, City of Carnation
6. Kirk Holmes, City of Snoqualmie
7. George Magnochi, Commercial Agriculturist, Two Sisters Dairy
8. Terry Olson, Water District #119
9. Larry Stockton, City of North Bend
10. Matt Stone, Business Owner, Stone Construction
11. Jim Westlake, Snoqualmie Valley Chamber of Commerce, Owner of Velocity Wireless

Others

Celia Kennedy, City of Seattle Public Utilities
Jalyn Cummings, Snohomish County,
Andy Dunn, Department of Ecology

ISSAQUAH CREEK GROUNDWATER PROTECTION COMMITTEE 2002 ANNUAL STATUS REPORT

Members of the Issaquah Creek Valley Groundwater Protection Committee (Committee) were appointed by King County Executive Ron Sims in September 2002 and confirmed by King County Council in October 2002.

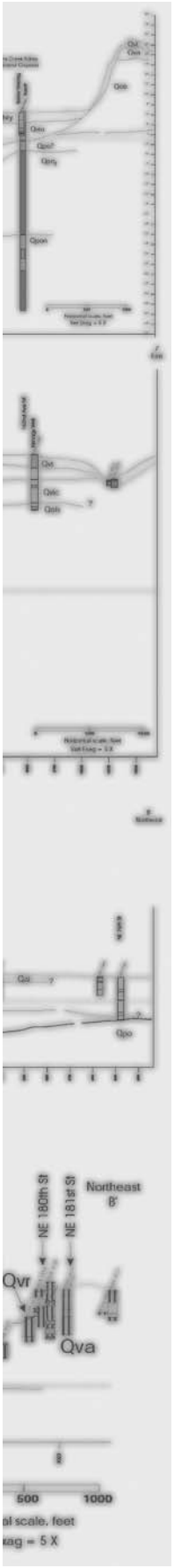
The members appointed to the Committee are:

1. Denise Smith, Groundwater Advisory Committee
2. Judy Passey, Mirrormont Water System/WA Water Service Co.
3. Ron Little, Sammamish Plateau Water & Sewer District
4. Elmer Green, Overdale Water Association
5. Ruth Kees, Residential Well User
6. Jim Stanton, Microsoft Corporation
7. Henry Thomas, City of Issaquah
8. Dick Thiel, City of Sammamish
9. Forest Lane, Lakeside Industries & Chamber of Commerce
10. Barbara Shelton, Issaquah Environmental Council

Additionally, the Washington Departments of Ecology and Health were invited to participate as non-voting members

The Committee did not meet in 2002. The first Committee meeting was scheduled for Thursday January 30, 2003 at the Issaquah Police Station.

Initial efforts will be oriented towards identifying and prioritizing tasks, and determining resources available to accomplish these. For the purposes of the Annual Report, the results for 2002 are limited to the creation of the Committee itself.



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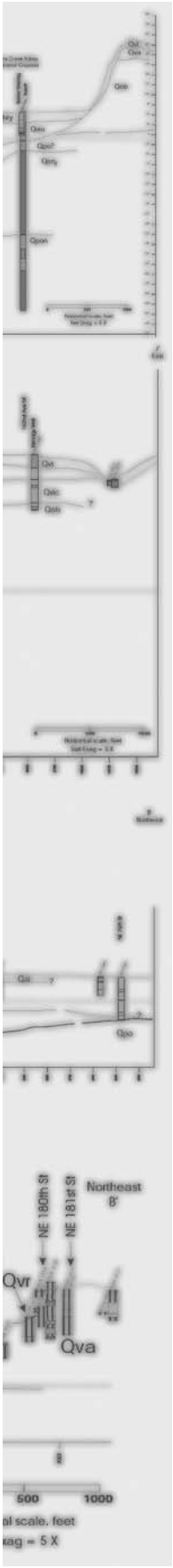

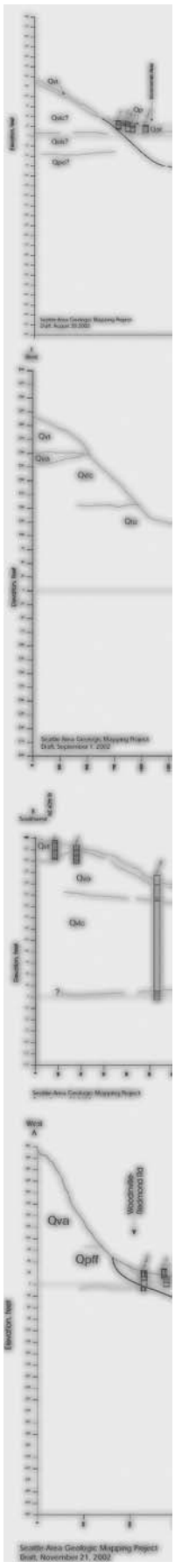

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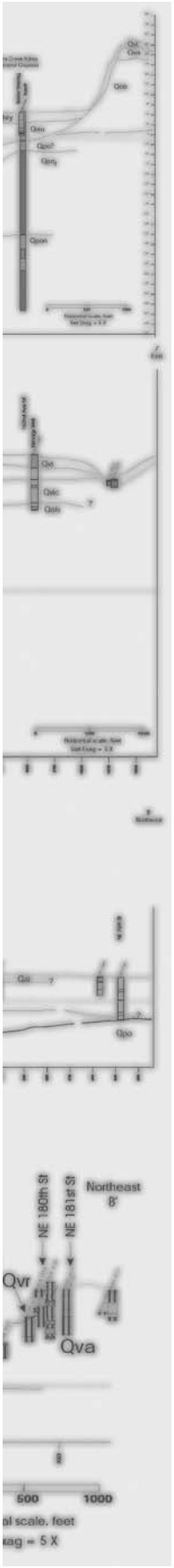

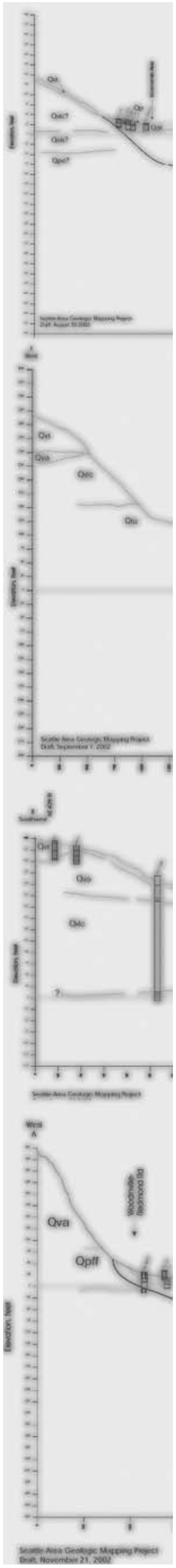
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King County 2002 Groundwater Protection Program Staff

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Ken Johnson, Groundwater Technical Team Lead
Chris Hughes, Engineering Technician
Joel Massman, Earth Scientist
Eric Ferguson, Water Quality Planner
Ray Eldridge, Groundwater Educator

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